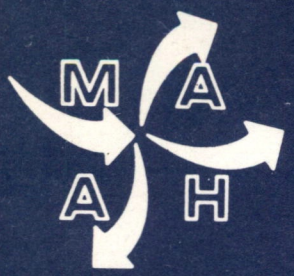

STRATEGIC BOMBING:
THE AMERICAN EXPERIENCE

by

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STRATEGIC BOMBING

Herman S. Wolk

....how can we defend ourselves? My answer to this has always been by attacking.

--Giulio Douhet, The Command of the Air

The No. 1 job of an air force is bombardment.

--General Henry H. Arnold, First Report of the Commanding General, Army Air Forces, to the Secretary of War, January 4, 1944

I.

The history of strategic* bombing is replete with paradox. In this violent twentieth century, no delivery weapon has generated more awe and terror than the strategic bombing plane. Yet the strategic bomber has enjoyed a relatively short period of dominance--primarily the 1940's through the early 1960's. Strategic bombing is commonly associated with the British and American bombing offensives of World War II. However, the first sustained strategic air campaign in history was launched during World War I. And Germany, the nation that first used these bombers, found itself without effective four-engine bombers in the Second World War.

Single-engine German planes had flown across the English channel in 1914 to drop bombs along the coast and in late 1914 the Royal Naval Air Service struck German airship sheds. Also, in January 1915, Zeppelins had attacked England and the Royal Flying Corps bombed a railway station and airship sheds. Then, beginning in late May 1917, the Germans launched Gotha and Giant bombers against England, a raid of June 13, 1917 on London resulting in 162 killed and 432 injured. The Germans lost no planes in this attack. Thus, in 1917 German "long-range" bombers delivered blows that marked the debut of the heavy strategic bomber.** These terror attacks were designed to collapse civilian morale. They came as a shock and generated a substantial British defensive effort. This "First Battle of Britain" resulted in average casualties of 47 per raid, including airship and

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* "Strategic" refers to long-range air attacks conducted independently of ground and naval forces, i.e., against industry, sources of the enemy's military power and against his population. By "tactical" is meant strikes against ground or naval forces and their supporting elements.

** The R.39 Giant bomber, used in the summer of 1917, was powered by four 245-h.p. engines. It had a wingspan of 138 feet, only three feet less than the B-29's of

airplane attacks. Altogether, 1414 people were killed and 3416 injured. The Gotha and Giant raids accounted for almost 60 percent of these casualties.[1] Nonetheless, the Germans were disappointed that their air attacks had failed to produce the material destruction they had anticipated.

This first strategic air offensive had an immediate psychological effect on the British, who feared more destructive raids and thus took immediate defensive action and also launched reprisal attacks aimed primarily to bolster their home morale. The Giant and Gotha attacks were thus the first to generate in civilians the terrible fear of being bombed by airplanes. This profound psychological reaction was lasting. In the immediate pre-World War II period, reinforced by the bombing in Spain and China, it accounted for much of the exaggeration of potential effects of strategic bombing.

These German air strikes of 1917 generated a British drive for retaliation. They also prompted a reconsideration of air power. As a result, a committee headed by Lieutenant General Jan C. Smuts recommended to the British War Cabinet formation of a separate air ministry and reported that since independent use of the air arm showed promise of becoming the principal means of conducting warfare, a separate air service should be established. Smuts noted that eventually aircraft would be able to devastate the enemy's "industrial and populous areas." Also, Major General Hugh M. Trenchard, Commander of the Royal Flying Corps, recommended creation of an independent air service. Thus, two soldiers who had been on opposite sides in the Boer War, Smuts and Trenchard, played important parts in the unification of British air power. At the end of 1917, an Air Ministry was established, coequal with the War Office and the Admiralty, and on April 1, 1918 the Royal Air Force was created, combining air power--including naval--into a single air force. And in June 1918, the Air Ministry organized an offensive force commanded by Trenchard. Known as the British Independent Air Force, it had nine squadrons (not all equipped with bombers) at war's end.[2]

Prior to the U.S. entry into the war in April 1917, the importance of the airplane's reconnaissance and pursuit roles had been recognized by the combatants. The Army Signal Corps thought reconnaissance most important. Signal Corps' doctrine made no mention of an independent bombardment mission.[3] Isolated from the technical and doctrinal development of the combatants, the United States entered the war with few planes and pilots and with little idea of how to build a combat air arm.

Consequently, in June 1917 the Army sent a mission headed by Colonel Raynal C. Bolling to Europe. Despite the fact that the mission's report represented a compromise between ground support and strategic bombardment roles, members of the mission had more enthusiasm for the strategic role than their report suggested. Bolling noted the conviction of members that importance of "bombing operations with direct military ends in view" could not be exaggerated.[4]

On October 15, Major Edgar S. Gorrell, a Signal Corps aeronautical engineer who had been Colonel Bolling's deputy and was now head of the Technical Section of the Air Service, proposed to Bolling that a heavy bombing campaign be launched against Germany. Such an effort, he said, would inflict "immense destruction" and would be possible only if the U.S. emphasized manufacture of bombers instead of pursuit planes.[5]

Also, during the autumn of 1917, Gorrell and Bolling had talked with Count Gianni Caproni, the Italian aircraft builder (close friend and collaborator of Giulio Douhet), who was enthusiastic about the possibilities of air bombardment. The Americans were receptive to Caproni's ideas. As to why subsequently they chose not to credit his influence, J.L.B. Atkinson has speculated that they may possibly have ignored the Italian's role due to failure of Italian arms in the war (Caporetto was a serious blow to Italian prestige) and also because Caproni was not himself a military man.[6] This explanation is less than convincing and it may be noted that over the years advocates and practitioners of strategic bombing--perhaps due to national rivalries--have not been quick or meticulous to record their intellectual indebtedness.

At any rate, on November 28, 1917 Lieutenant Colonel Gorrell, now Chief of the Strategical Aviation Branch of the Air Service in France, submitted to Brigadier General Benjamin D. Foulois, Chief of Air Service, American Expeditionary Forces in Europe, a proposal to bomb German industrial areas around Dusseldorf, Cologne, Mannheim and the Saar Valley. "The object of strategical bombing," he observed, "is to drop aerial bombs upon the commercial centers and lines of communication in such quantities as will wreck the points aimed at and cut off the necessary supplies without which the armies in the field cannot exist."[7] Gorrell's has been recognized as the first American strategic bombardment plan. In it he noted that during the war even a minor ground operation demanded a "heavy toll of life and material." If conduct of war was to be changed, in Gorrell's terms, "a new policy of attacking the enemy must be adopted."[8] This would be aerial (strategic) bombing of the enemy's manufacturing centers.

Although some airmen thought of using planes to strike directly at industry and population, they had neither the power of decision nor as it turned out, enough time. The late-arriving American army conformed to the existing pattern of warfare, a grinding war of attrition and reinforcement. The airplane was used primarily to observe and photograph enemy formations and for artillery spotting. However, during June-November 1918, the Independent Air Force attacked German industrial towns, and when the war ended Trenchard was prepared to hit Berlin with his twin-engine Handley-Page night bombers. Also, production of four-engine Handley-Page bombers had started. These planes could carry 7500 pounds of bombs to Berlin; about 250 were on contract and three had been delivered. The Air Service, AEF, also had plans to strike Germany, and in October 1918 the Allies had agreed to form an Inter-Allied Independent Air Force, whose mission was to attack Germany's industry, commerce and population. Mitchell declared that within a year the Americans would have bombed Berlin and other major cities.[9]

During the course of war, the use of planes had advanced from reconnaissance to direct support of ground troops. As U.S. Army commanders understood, these were useful roles for the Air Service. Subsequently, when airmen argued that air bombardment really had not been tried and that trench warfare was too costly and even self-defeating to be considered again, they were thought visionary. As Lieutenant General Ira C. Eaker recalled: "We were just sort of voices in the wilderness. A great many military people considered us crackpots."[10] The wartime Chief of Staff, General Peyton C. March, concluded:

> The war had taught many lessons; the principles of warfare, however, remained unchanged. It was not won, as some had predicted it would be, by some new and terrible development of modern science; it was won, as has every other war in history, by men, munitions and morale.[11]

The Dickman Board--established after the war by General Pershing--concluded that the air arm's proper role was support. Similarly, Assistant Secretary of War Benedict C. Crowell, Chief of Staff General March and Secretary of War Newton D. Baker emphasized the auxiliary function. After the war, training guides stressed support to field forces and in 1920 a Command and General Staff School textbook described the airplane's role as basically observation.

The fact was that the war ended without having provided any sustained demonstration of the offensive power of aircraft. Nonetheless, airmen like Trenchard and Mitchell pondered what longer range bombing planes might accomplish. Statesmen, stunned by the slaughter in the trenches, searched for alternatives. Potentially, the airplane provided the means to circumvent the front lines, to attack the enemy's homeland, where his population could be bombed and its morale weakened to a point where effective resistance would cease. Consequently, with the Independent Air Force as example and fortified by their own ideas (though little experience), a number of American airmen came out of the war convinced that eventually their judgment as to the airplane's offensive potential would be proved correct. In

addition to Mitchell, among these airmen in the 1920's and 1930's included Colonel Frank M. Andrews, Lieutenant Colonel Henry H. Arnold, Major Carl A. Spaatz and Captain Ira C. Eaker.

They argued that airplanes should be designed and equipped for tasks they were expected to perform. They noted two types of air operations: Air-cooperation missions and air-force missions. Planes should be equipped differently for these roles. Air-cooperation included observation, troop support and attacking communication lines and supply dumps. Air-force operations comprised operating heavy bombardment aircraft against industry and rail centers. These missions would be designed to impede or stop manufacture of war materials and to prevent their delivery to troops.

The Air Service did not conduct an examination of wartime operations or establish doctrine based on war experience. After the war, officers who favored formulation of an official strategic bombardment doctrine failed to carry their point. Though strategic bombardment had its start in World War I, in the immediate postwar years air doctrine remained substantially what it had been in 1917. In the early 1920's, design of new bombers failed to measure up to what was anticipated by bomber enthusiasts, falling short in range, altitude and bomb load. Little advance would be realized over the Martin MB-2 (1920) until almost 1930 when two-engine craft were built which, in turn, led the way to larger planes.

The years between the world wars would be marked by a struggle to secure a separate air mission and an independent air force. These objectives became intricately tied to evolution of strategic bombing doctrine and capabilities. It would take almost thirty years and another world war before the air arm would be made independent, coequal with the Army and Navy.

The Army Reorganization Act of 1920 established the Air Service as a combatant branch of the Army. This was not satisfactory to those who, like Billy Mitchell, thought the airplane more effective and economical than the battleship and that an independent air service was the best way to exploit this new weapon. Mitchell's argument with the Navy reached a climax in June-July 1921 off the Virginia Capes when the 1st Provisional Air Brigade under his direction (using, among other planes, new Martin MB-2 bombers) destroyed a number of German warships including the allegedly unsinkable battleship Ostfriesland (a 27,000-ton ship that had been in the battle off Jutland) with its four layers of steel and watertight bulkheads.* Not satisfied with the official report of this demonstration and irked because his own conclusions had not been made public, Mitchell leaked his findings to the press.

Meanwhile, Major General Mason M. Patrick, Chief of Air Service, who had complained the air arm could not meet even its peacetime responsibilities, proposed in 1922 that the Air Service be split into two groups: (1) Observation and balloon units supporting the Army; and (2) pursuit, bombardment and attack units operating independently. Patrick also advocated that the Army take over the air defense mission from the Navy.

To consider these proposals, Secretary of War John W. Weeks established a board in March 1923 under Major General William Lassiter which, although it emphasized support aviation, agreed with Patrick's criticism and advocated a ten year expansion program and a quasi-independent strategic arm. This marked the first time the Army had acknowledged the independent air mission. However, the War Department denied approval, thus launching Mitchell on an abrasive campaign to persuade the nation to adopt what he considered to be a far-sighted aeronautical

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* Secretary of the Navy Josephus Daniels allegedly had offered to stand bare-headed on the bridge of any ship Mitchell wanted to bomb.

plan.[12] Testifying before the Lampert Committee investigating military aviation, Mitchell charged that those shaping air organization had failed to understand the airmen's objectives.[13]

According to Mitchell, the remedy lay in formation of a Department of Aeronautics and a Department of National Defense to supervise the three services. He was supported by Patrick (and, among others, Major Carl Spaatz), but the War and Navy Departments noted indisputably that aviation had never decided a war. Nonetheless, they recognized the airplane's capability for reconnaissance and ground support. In December 1925--nine months after hearings ended--the Lampert Committee recommended to Congress that a Department of National Defense under a civilian secretary be established. Implied was the idea of three equal services. However, neither the War Department nor Congress acted. Even before these proposals were submitted, still another group (the Morrow Board) had come out against them.

Meanwhile, Mitchell's protestations had taken on an irascible tone and in testimony, writings and appearances he berated his opponents--questioning their integrity--and declared that the air arm was not adequately prepared for war and that airmen were being muzzled. Stung by these charges, Secretary of War Weeks in March 1925 reduced Mitchell from Brigadier General and Assistant Chief of the Air Service to Colonel and Aviation Officer for the Eighth Corps Area at Fort Sam Houston.

In September 1925, President Calvin Coolidge, concerned about this bitter controversy, ordered an investigation of the "best means of developing and applying aircraft in national defense." He appointed an old friend from the J.P. Morgan Company, Dwight W. Morrow, as board chairman. Most members and witnesses evoked the traditional military view against an autonomous air arm. Colonel Mitchell proposed a Department of National Defense and Secretary Weeks and high-ranking military officers defended the status quo.[14]

The Morrow Board report of November 30, 1925 came out against formation of a Department of Aeronautics, observing that air power had not yet proved its value for independent operations. Such missions could "be better carried out under the high command of the Army or Navy...." The United States had no reason to fear an enemy air attack: "No airplane capable of making a transoceanic flight to our country with a useful military load and of returning to safety is now in existence.... With the advance in the art....it does not appear that there is any ground for anticipation of such development to a point which would constitute a direct menace to the United States in any future which scientific thought can now foresee....The fear of such an attack is without reason."[15] Although it opposed creation of a Department of National Defense, the board's recommendations for a name change--from Air Service to Air Corps--and appointment of an Assistant Secretary of War for Air bore fruit with the Air Corps Act of 1926.

Nevertheless, Mitchell's attacks became more vituperative. After naval aviation disasters involving disappearance of an aircraft in the Pacific and the crash of the dirigible Shenandoah, he declared that the War and Navy Departments were guilty of "incompetency, criminal negligence and almost treasonable administration of the National Defense."[16] As a result, President Coolidge himself preferred charges and the War Department announced that Mitchell would be court-martialled. The trial began in October 1925 and the verdict of five years suspension without pay was handed down in December, two weeks after the Morrow Board report appeared.* Subsequently, Coolidge modified the verdict to five years at half pay. On February 1, 1926, Mitchell resigned.

Billy Mitchell was especially adept at recognizing promising ideas to develop and publicize. He was ahead of his time, one of America's most brilliant technologists, impatient because others would not share his enthusiasm and confidence in

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*For a consideration of Mitchell's court-martial, see Burke Davis, The Billy Mitchell Affair, Random House, New York, 1967.

machines that had yet to demonstrate their capacity. His vindication awaited the development and production of planes not yet on the drawing board.

Having the energy of a crusader, he had been driven by issues that when aired publicly could only arouse discord. Not given to compromise, he became isolated. After Franklin Roosevelt became President, he hoped to influence a change in air policy, but he couldn't turn the tide and soon became disenchanted. He died in February 1936, a proud zealot to the end.

III.

The Air Corps Act of 1926 failed to satisfy air advocates. The Air Corps was still subject to control of the War Department, which maintained that ground support was aviation's major function. There was little appreciation of the idea of an independent air mission. Also, the public's opposition to bombing became more intense. The First World War had made a lasting impression; the nation grew increasingly isolationist.

Nonetheless, instructors at the Air Service Field Officers School--established at Langley Field, Va. in October 1920*--fashioned air doctrine based on independent air operations. In 1926, the Tactical School published Employment of Combined Air Force** which for the first time articulated the idea that the basic air objective was the enemy's "vital centers," population and air force. Recent scholarship

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*In November 1922, the school's name was changed to the Air Service Tactical School (ASTS) and in 1926, when the Air Service became the Air Corps, to the Air Corps Tactical School (ACTS). In July 1931, it moved from Langley to Maxwell Field, Alabama.

**Subsequently revised numerous times under the title Air Force.

points to General Giulio Douhet's influence, an English translation of his Command of the Air (1921 edition) being available at the school as early as 1923. Employment of Combined Air Force borrowed heavily from Douhet, emphasizing that attacks on "morale" (population) should be made at the outset of hostilities. Also like the Italian theorist, it stressed the importance of neutralizing the enemy's air force.[17]

While the Air Corps Tactical School debated air doctrine, the Kellogg-Briand pact outlawing war had been signed in August 1928, but in September 1931 Japan invaded Manchuria and in January 1933 Hitler became German Chancellor. On October 14, 1933, Germany withdrew from the League of Nations. The paradoxical flavor of this period was conveyed in February 1932 with the convening of the League of Nations World Disarmament Conference. The American position was reflected in President Hoover's proposal that bombers be eliminated: "This would do away with the military possession of types of planes capable of attacks on civil populations and should be coupled with the total prohibition of all bombardment from the air."[18] However, little progress was made and in June 1934 the conference broke up.

In view of the deteriorating world situation, the War Department asked the Air Corps to increase its readiness in 1933. The resulting air plan emphasized coastal air defense and bombardment, attack and pursuit and at the request of the Secretary of War, was reviewed by a General Staff group under the Deputy Chief of Staff, Brigadier General Hugh A. Drum.

The Drum Board report of October 1933* recommended formation of a General Headquarters (GHQ) Air Force to direct strategic air operations and ground support missions. However, the proposal for a GHQ Air Force was not immediately adopted and during the winter of 1933-1934 a crisis developed involving the Air Corps. Postmaster General James A. Farley had suddenly cancelled contracts of private

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*The board was composed entirely of ground officers with the sole exception of the Chief of Air Corps.

mail carriers because of contractual irregularities and he had directed the Air Corps to take over mail routes. But the Air Corps lacked the proper equipment and training for this rugged task and within three weeks a series of accidents ensued which took ten lives. In the wake of public outrage, in April 1934 a board was appointed--the War Department Special Committee on Army Air Corps--under former Secretary of War Newton D. Baker to review air policy.

The Baker Board concluded that "independent air missions had little if any effect upon the issue of battles and none upon the outcome of the war."[19] This had not changed during intervening years and thus only minimal military forces were required. Aviation, observed the board,

> has vital limitations and inherent weaknesses. It cannot invest or capture and hold territory--operating bases, land or floating, are absolutely essential to its operations and they have to be protected from land, air and sea attacks--operations of large air forces are dependent on at least fairly good weather--under present developments, in distant overseas flights, all available load capacity has to be devoted to fuel, leaving little space for military munitions. To date no type of airplane has been developed capable of crossing the Atlantic or Pacific with an effective military load, attacking successfully our vital areas, and returning to its base. 20

Talk of "air invasion" of the United States failed to take geography and the state of technology into account; also, the cost of aircraft was exceedingly high. No nation could afford to base its defense on visionary conceptions.

The board saw no reason for a Department of Aviation or a Department of National Defense and it emphasized its faith in conventional military organization of air and ground components with surface forces predominating. Nonetheless, acting on the Drum report, the Baker Board recommended the creation of a General Headquarters Air Force composed of air combat units capable of either ground support or independent

operations. This force would be under control of the General Staff in peacetime and the commander of Army Field Forces in wartime. The Chief of Air Corps would be responsible for procurement, supply, and training under the War Department.[21]

Some interpreted the board's action as a move to head off the drive for a separate air arm and an effort to strengthen the hold of the General Staff on the Air Corps. Mitchell charged it was just another "whitewash." However, others--including Colonel Henry H. Arnold--were willing to go along with the proposal, realizing the road to autonomy would be long. The report was signed by all members except James H. Doolittle, who observed that the nation's security would be dependent on an adequate air force and that "the required air force can be more rapidly organized, equipped and trained if it is completely separated from the Army and developed as an entirely separate arm."[22] If the air arm should remain part of the Army, wrote Doolittle, then it should have its own budget and promotion list and be removed from control of the General Staff. Failing this, the Air Corps should be expanded under direction of the General Staff, as recommended by the board. The GHQ Air Force was established on March 1, 1935, Lieutenant Colonel Frank M. Andrews was chosen as its head, and Arnold was made Commanding Officer of the 1st GHQ Wing, March Field, California.

Meanwhile, in February 1935, Germany announced existence of the Luftwaffe. In March, Hitler proclaimed the Reich had achieved air parity with Britain. And on October 3, 1935 Italy declared war on Ethiopia.

IV.

Concurrent with these developments, design and testing of modern bomber planes and bombsights narrowed the gap between bombardment theory and the machines and equipment available to carry it out. Again a conflict emerged between the Air Corps and the War Department. During the 1920's, air leaders wanted two bombers; one,

for daylight use, featured high speed but short range, a small bomb load and adequate defensive power. For night operations, another would possess little defensive armament but have long range and be able to carry a heavy bomb load. In 1928, the War Department recommended that the plan for two bombers be scrapped in favor of an all-purpose bomber. The Air Corps rejected this view and subsequently the War Department, on the surface at least, dropped the matter. Then, in the mid-1930's the airmen emphasized long range as the critical factor and the issue then became light or medium bombers (short range) as opposed to heavy bombers (long range).

At the same time, the precision daylight bombing doctrine gained ascendancy and air theorists debated whether or not escort fighters were necessary. Until 1930, the Air Corps felt that bombers would have to be escorted by pursuit aircraft, but by 1935 bombardment officers emphasized speed, range and altitude and thought that escorts were not required. Those who wanted escort fighters lost their battle as the budget did not allow developing both types of planes. As a result, by the Second World War, the U.S. had no modern escort fighter; just in time, at the end of 1943, the P-51B Mustang would be ready. But by 1935, the bomber advocates had gained command and were driving hard for the high altitude daylight precision concept. By 1932, the Air Corps had begun testing the Boeing B-9 and Martin B-10 bombers. The B-10 was an all-metal monoplane with a speed over 200 mph, a ceiling of 21,000 feet and a 900-mile range. This craft would open the way for development of larger and faster bombers.* Development of the Norden (1931)** and Sperry (1933) bombsights gave bomber advocates what they needed for precision

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* For a discussion of the Army's development of the strategic bomber during the 1930's, see Robert W. Krauskopf, "The Army and the Strategic Bomber 1930-1939," Military Affairs, Summer 1958.

** In 1933, the Air Corps contracted for two improved versions of this bombsight.

bombing, which they felt was now more than just a phrase. Under the GHQ Air Force, bombing accuracy substantially improved.

By 1934 the Air Corps had started engineering studies and announced design competition to build a long-range, multi-engine bomber capable of carrying a 2000-pound bomb load. Only the Boeing Airplane Company submitted a design for a four-engine aircraft. Its Model 299, featuring great range, substantial carrying capacity and high speed, became the prototype of the B-17 Flying Fortress. The XB-17 went through flight testing in 1935, and on August 20, 1935 it flew from Seattle to Dayton at average speed of 252 mph, setting a nonstop record for the 2100 miles. By August 1937, thirteen YB-17's had been delivered to the Air Corps.

As mentioned above, air leaders were of course aware of the gap separating doctrine from available weapons. Geography and technology remained constricting factors. An enemy attack on the United States would have to be made by an expeditionary army supported by naval units or by aircraft launched from bases in the Western Hemisphere. Thus, the defensive mission of the bomber had brought Army aviation into conflict with the Navy, which vociferously opposed employing land-based bombers for coastal defense.

This interservice dispute erupted after the war and continued during the 1920's. In January 1931, a meeting between Army Chief of Staff General Douglas MacArthur and Chief of Naval Operations Admiral William V. Pratt resulted in an agreement which spelled out the services' responsibilities. Naval air was to conduct missions directly connected with fleet movements; land-based Army air would defend the home coasts (and overseas possessions) and conduct reconnaissance and offensive operations beyond the lines of ground forces.

However, the MacArthur-Pratt understanding did not endure because Pratt's successor, Admiral Standley, repudiated the agreement. And in 1934, the Joint Board, in "Doctrines for the Employment of the GHQ Air Force," stated that the

fleet maintained primary responsibility for coastal defense and inferred that the Army air arm would be used only in cases where there was insufficient naval power to deal with a situation at sea.

In May 1938, this dispute broke dramatically when, during joint maneuvers, three B-17's flew 600 miles into the north Atlantic to intercept the Italian liner Rex. It was located and the Air Corps made certain that details of this operation found their way to the press. Naval authorities were furious and as a result the War Department issued a verbal directive prohibiting Army air operations more than 100 miles from the coast.

Meanwhile, as noted, by the early 1930's bombardment theorists at the Air Corps Tactical School--confident that bombers capable of long range, able to carry heavy bomb loads, eventually would be produced--had formulated the high-altitude daylight precision concept. The idea was to attack industry and ultimately, if necessary, morale. American airmen had been trained to sink ships and Mitchell's demonstration against obsolete warships appeared to prove the feasibility of precision bombing. Aircraft were not yet able effectively to bomb at night. Illuminated bombsights would not be developed until World War II. Another reason for emphasis on precision was the public's aversion to population bombing.*

As to the emphasis the school gave the importance of breaking the "hostile will," the evidence indicates it was substantial. Instructors noted that "no barrier can be interposed to shield the civil populace against the airplane." As a potentially effective mode of conflict if not yet an instrument of national policy, air power could strike swiftly at the will to resist. The instructors saw

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*Air historians have frequently observed that the precision concept owed much to the American tradition of marksmanship. This may have been a factor, but a more persuasive case needs to be made for the climate of opinion in the 1920's and 1930's which was strongly opposed to bombing cities. General Arnold, a perceptive judge of opinion, was impressed with this public feeling.

war as a consequence of conflicting national aims. Its objective was "to force an unwilling enemy government to accept peace on terms which favor our policies. Since the actions of that hostile government are based on the will of the people, no victory can be complete until that will can be molded to our purpose."[23] The key was the "peculiar power" of the air arm--the capacity to strike a crushing blow. Could air forces win a war on their own? Whether they could or not, "sound strategy" demanded the effort be made. This called for using air power strategically; it did not mean support missions, considered a misuse of air power.[24] This was pure Douhet.

Imaginative tactics were required if "air warfare" was to be waged: "We have here, not a useful new weapon to be used as an adjunct to the old, not a new projectile to be included in the family of supporting fire weapons; but an instrument which allows us to adopt a new method of waging war...."[25] As to how the school's instructors could promulgate an air doctrine that featured the strategic offensive and yet depended on aircraft without sufficient range, they were counting on better airplanes and overseas bases.[26]

The interwar period was marked by the debate over how to organize air forces and how best to use the air weapon. Did the airplane really offer a shortcut around the battlefield? Military traditionalists found it difficult to accept the idea of strategic bombing as a means to avoid a bloodbath like World War I. In retrospect, Brigadier General Haywood S. Hansell, Jr., a leading American air planner and World War II commander, noted that "....proponents of the two ideas soon lost all sense of proportion in the very intensity of their zeal. There was a tendency of the airmen to advocate strategic bombing to the exclusion of all else; and of the ground soldiers to view bombardment simply as more artillery." Hansell also observed that if the General Staff belittled the airmen's claims, "it must also be admitted that at least in some very small measure we may possibly have overstated our powers and understated our limitations."[27]

V.

Prior to World War II, the bomber had not been combat-tested. Strategic bombing was theory more than anything else. Wild exaggerations of possible bombing effects were not uncommon. Meanwhile, Germany--which had pioneered strategic bombardment in the First World War and in the early 1930's had formulated doctrine calling for bombers to be used against the enemy's industry and population--began to emphasize tactical bombing as a result of the death of Walter Wever (Chief of Staff of the Luftwaffe who had fostered development of a four-engine bomber) and the Luftwaffe's experience in the Spanish Civil War. In 1937, the Germans cancelled the high priority for long-range bombers.

After war had broken out in Europe, a series of Anglo-American meetings was held in early 1941 resulting in joint plans which described the European theater as decisive and forecasting an air offensive and invasion of Europe. In concert with these plans, Air War Plans Division-1 (AWPD-1)--submitted in August 1941 at President Roosevelt's request--outlined a sustained air campaign against Germany and if necessary, an invasion of the continent. Target systems included electric power, transportation, aircraft production, petroleum and synthetic oil. Further, it noted that "if the morale of the people is already low....then heavy and sustained bombing of cities may crush that morale entirely."[28] If morale was not down, area bombing might "actually stiffen" the people's will. Daylight missions deep into Germany could be flown without escort; however, an escort craft should be developed "for test without delay."[29]

Neither Britain nor the United States (after the Japanese attack on Pearl Harbor) was prepared immediately to conduct a bombing offensive against Germany; both nations lacked bombers and crews. To make matters worse, the RAF miscalculated that it could bomb in daylight without sustaining unacceptable losses. Finding these losses severe, the RAF turned in April 1940 to night bombing and then found

it could not hit industrial targets with precision. Consequently, in 1942 Bomber Command had turned to area bombing. By the end of 1942, under Air Marshal Arthur Harris, Bomber Command was committed to night area bombing.

Meanwhile, Arnold had emphasized that precision daylight bombing "as planned by the Eighth Air Force and for which it is equipped and trained, can be estimated conservatively as having twice the effectiveness of the broad, area-target, night bombing for which the RAF is equipped and trained."[30] He firmly believed (Spaatz and Eaker concurred) that German morale could be broken with the result that Allied troops would have a comparatively easy time applying the final touch. After Germany fell, Japan could be knocked out without great difficulty.[31] Air leaders realized that early, simultaneous air campaigns against Germany and Japan would not be possible.

Casablanca?

These assumptions formed the basis of AWPD-42 (September 1942) which envisioned a combined bomber offensive, the AAF conducting daylight operations and the RAF bombing at night. This plan made no mention of escort fighters since it was still thought feasible to conduct high altitude daylight bombing (20,000-25,000 feet) despite enemy anti-aircraft and fighter defenses.[32] AWPD-42 remained the primary air plan until the Casablanca conference.

Following established doctrine then, American strategy called for unescorted bomber formations. Between 1935-1942, airmen had come to this conclusion because it appeared that to build a long-range escort, a multi-engine craft would be required which would, in effect, not be a fighter plane at all. It was thought that if an escort could be designed with sufficient range to accompany bombers, it wouldn't be able to bring down enemy interceptors. The RAF had come to this same conclusion shortly after the war began. Thus, Army Air Forces thought a long-range escort not technically feasible and moreover, calculated that B-17's and B-24's in tight

formation could generate enough defensive firepower to prevail.* The Schweinfurt and Regensburg raids in 1943 destroyed this doctrine.

General Eaker was much concerned about the increasingly potent German defense. He had hoped the P-47 could do the escort job, but it arrived in England without external fuel tanks, lacking sufficient range. Air Marshal Harris thought that if the Eighth Bomber Command joined the RAF at night Germany might be knocked out of the war. One thousand bombers per raid instead of a few hundred, he figured in April 1942, "and we've got the Boche by the short hairs."[33] Successful saturation raids in May and June 1942 convinced him that these gigantic attacks would annihilate the enemy. Harris believed that the Germans would circumvent the effects of selective bombing--there were no "panacea" targets--and thus destruction of towns was the only way to defeat them. In July 1942, Churchill observed that "the severe, ruthless bombing of Germany on an ever-increasing scale will not only cripple her war effort....but will also create conditions intolerable to the mass of the German population...."[34]

In January 1943, the Casablanca conference became the point at which the Americans had to defend daylight attacks when they were not proving especially fruitful. At Casablanca, Arnold called on Eaker in an attempt to convince the British that daylight bombing could work and was in the best interests of the common cause against Hitler.**

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* In retrospect, Hansell observed that this assumption "was based on hope and not on existing fact. We had no power operated turrets....We had no 50-caliber defensive guns. We had no gunners who could hit anything....And yet our entire doctrine hinged on the defensive fire power potential, although to the best of my knowledge we have never really learned to shoot defensive guns." (Hansell, "The Development of the United States Concept of Bombardment Operations," Lecture to Air War College, Air University, September 19, 1951).

** Generals Spaatz and Frank M. Andrews also spoke with the Prime Minister and prior to Eaker's presentation Arnold had talked with Churchill "long and hard" about the importance of continuing daylight precision bombing. Churchill had all along argued for long-range fighters. (H.H. Arnold, Global Mission, Harper & Brothers, New York, 1949, p 396).

Eaker told Churchill that the Eighth Bomber Command had been held back by inexperienced crews, lack of long-range fighter escort, the commitment to "Torch" (North African invasion) and by poor weather; nonetheless, the Eighth's loss rate in daytime was lower than the RAF's at night. For every U.S. bomber downed, the Germans had lost between two and three fighters. He believed that day and night bombing were not mutually exclusive. Day bombing would augment the night effort, being more accurate--expecially against small targets--and the Germans would not be able to rest. Fires set by day would guide the British at night, an around-the-clock offensive. Eaker argued forcefully that the AAF was trained for day operations; should it operate at night, losses would increase. It would take months for the Americans to prepare for effective night operations.[35]

According to Churchill, General Eaker pleaded his case "with powerful earnestness, skill and tenacity."[36] The Prime Minister accepted his argument and Arnold recalled that "we had won a major victory, for we would bomb in accordance with American principles, using the methods for which our planes were designed."[37] On January 21, 1943, the Combined Chiefs of Staff issued the Casablanca Directive for the joint bomber offensive which described the primary objective as "the progressive destruction and dislocation of the German military, industrial and economic system, and the undermining of the morale of the German people to a point where their capacity for armed resistance is fatally weakened."[38] This directive established the major target systems as submarine yards and bases, aircraft industry, transportation, oil and other important industries. "We shall not only destroy industrial objectives," Arnold observed, "but the moral fibre of the people to resist."[39] In June, the Combined Chiefs approved the so-called "Pointblank" offensive which designated fighter plane production the critical target, thus singling out a target system whose crippling would help make the planned Allied invasion a success.[40] The issue of area as opposed to precision bombing was not settled. With the Combined Bomber

Offensive, both countries continued the tactics for which they were best suited, the British area-bombing at night, the United States pursuing daylight raids against selected targets.

But Eaker was worried. He acknowledged that "there is no question that our bomber losses will be greatly reduced when our fighters are ready to accompany us."[41] On May 4, 1943, P-47's escorted for the first time (over a short distance) and though this apparently reduced attrition, the P-47 and the Spitfire lacked the range to protect the B-17's on deep penetrations.* Then, after a trip to England in June, Assistant Secretary of War for Air Robert A. Lovett emphasized to Arnold that the only certain way to cut down bomber losses was to protect them all the way to the target and back. Acting on Lovett's view and what he considered to be a rapidly worsening situation, Arnold directed that a crash program be established to have a long-range fighter ready within six months.

Even when equipped with an auxiliary fuel tank, the P-47 lacked sufficient range for deep penetrations. The Regensburg-Schweinfurt (August) and Schweinfurt (October) raids, in which the Americans lost 120 bombers and hundreds of crewmen, brought about a crisis. These losses were prohibitive though results against the ball-bearing factories at Schweinfurt were judged good.** At any rate, in the face

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*The usual procedure was for Spitfires and P-38's to escort bombers across the channel; then P-47's would take them almost to the German border. After that the bombers were on their own.

**Based on studies done by his operations analysts, General Arnold thought "that a stoppage, or a marked curtailment, of the production of ball bearings would probably wreck all German industry." (Letter, Arnold to Harry L. Hopkins, White House, March 25, 1943, in Arnold Collection, Box #39). In his memoirs, Albert Speer, Hitler's Minister of Armaments and War Production, emphasized the importance of the ball-bearing industry. Had the Schweinfurt attack been followed up, he noted, the result for Germany would have been catastrophic. Speer's analysis was as follows: "Armaments production would have been crucially weakened after two months and after four months would have been brought completely to a standstill." However, this was contingent on simultaneous attacks on all ball-bearing factories including those in France and Italy; on repeating these attacks "three of four times every two weeks;" and on preventing the factories rebuilding. (See Speer, Inside the Third Reich, Macmillan, New York, 1970, p 285). Speer is undoubtedly correct that the ball-bearing industry was vital. Nonetheless, considering losses Eighth Bomber Command was taking, it could not have continued to bomb week after week. In 1943, it didn't have long-range escort or the resources--crews and equipment--to sustain that kind of effort. It was out of the question.

of heavy pressure to scrap daylight bombing, General Eaker was more convinced than ever that the answer was long-range escort all the way to the target rather than a switch to night bombing. During the week of the second Schweinfurt mission, the Eighth lost 148 planes with crews. As a result, Operation Pointblank came to a halt. Deep raids were scrubbed; but on December 13, 1943 Kiel and Hamburg were visited and for the first time P-51B Mustang fighters accompanied the bombers. Equipped with auxiliary drop tanks, they performed exceptionally well and by April 1944 were considered the best long range escort. In February and March, the Mustangs and P-47 Thunderbolts* of Eighth Fighter Command gained air superiority, assured the success of the bomber offensive and most importantly, secured the invasion of the Continent.**

VI.

By the time escort fighters had achieved control of the air, Arnold had become dissatisfied with what he felt was the slow pace of the Eighth's campaign. Consequently, he directed Eaker to leave his Eighth Air Force command (effective December 22, 1943) to become Air Commander-in-Chief of the newly formed Mediterranean Allied Air Forces. In Washington, General Arnold had been under considerable pressure to show results. According to Eaker: "We had to make a showing for General Arnold which would convince the Joint and the Combined Chiefs of Staff

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* Professor William R. Emerson thinks the P-47 won the battle: It "first put the German Fighter Command back on its heels. Others were to exploit the victory; the P-47 won it." (Emerson, "Operation Pointblank: A Tale of Bombers and Fighters," Harmon Memorial Lecture, No. IV, 1962, U.S. Air Force Academy, Colorado).

** In 1940, the British had ordered the Curtiss-Wright P-40 Tomahawk from North American, but at that company's suggestion had gone along instead with their P-51 Mustang. The Air Corps tested two models and found them unsatisfactory. However, the RAF placed an order and received the first Mustangs with Allison engines in November 1941. However, the RAF found this version unsatisfactory. In late 1942, the Mustang was modified, the P-51B featuring a different airframe and a Rolls-Royce Merlin engine produced by Packard in the United States. It could do about 450 mph at 30,000 feet, better than German fighters. It made the difference and it could have been operational earlier had the need been recognized and had the P-51's potential been appreciated.

that our effort was worth the amount of material and personnel we were using." Eaker noted "this tremendous pressure" that he felt to get out more bombers, day after day: "If we had kept this up day after day we would have had no bombers left. I said to General Arnold that it was going to be my policy to conduct our operations at such a rate that we will always be growing and therefore a more menacing force. I will never operate at such a rate that I will be a diminishing and vanishing force....this argument was conducted over a period of several months. Quite intense, quite bitter."[42] At the same time, Spaatz returned to England from his Mediterranean command to head the United States Strategic Air Forces in Europe, under Eisenhower, who was to become Supreme Allied Commander for OVERLORD (invasion of western Europe).* Air Chief Marshal Sir Arthur Tedder became Eisenhower's deputy and Air Commander-in-Chief for OVERLORD.

As noted, Arnold had grown increasingly impatient. The bombing campaign against German fighter production had appeared logical, but Germany's ability to disperse airframe plants had been underestimated. In retrospect, it was discovered that engine plants, which could not be dispersed, were more vulnerable than airframe factories, which could be hidden in forests and caves. "The object of bombardment," Arnold observed, "is destruction. Despite our highly developed precision methods of bombing and our highly developed and specialized types of bombs, this process involves a long and costly effort to obtain a cumulative effect."[43] However, beginning in May 1944, the tide turned with the offensive against oil production.

In early 1944, Spaatz--now with long-range escort--was determined to send daylight bombers deep into the Reich. The primary target would be synthetic oil.

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* Major General James H. Doolittle came from the Mediterranean to command the Eighth Air Force and General Sir Henry Maitland Wilson took Eisenhower's place as Mediterranean commander. Brigadier General Joseph K. Cannon took Spaatz' command at Twelfth Air Force and Major General Nathan F. Twining took over the Fifteenth with its additional fifteen heavy bomber groups (originally scheduled for the Eighth) to be used against Pointblank targets thereby complementing bomber operations from the UK.

General Spaatz argued that the Germans would defend these targets and thus provide the opportunity to destroy the Luftwaffe. Insufficient fuel would affect German transport and industry and, at the crucial point, the enemy's ground forces. Spaatz proposed a strategy to cripple Germany's war economy and her ability to contest OVERLORD.*

However, Eisenhower argued that he should have control over all air power, including Spaatz' and Harris' bombers. He was backed by Tedder, who wanted a sustained attack against transportation, especially railroads. Eisenhower endorsed this railway plan, convinced it was necessary to the success of OVERLORD. The Supreme Commander staked everything, declaring that since he was invested with overall responsibility he could not accept anything less than complete operational control. Should he lose on this issue, he would withdraw from command.

Arnold had concluded that it would be unwise to oppose Eisenhower on this issue. Thus, though he encouraged Spaatz to press his view, Arnold himself took the position that this was a matter for Eisenhower to decide.[44] In March Portal worked out a compromise whereby Tedder would develop the overall air plan, advised by Spaatz and Harris, and the tactical plan would be formulated by Air Marshal Sir Trafford Leigh-Mallory, Commander-in-Chief, Allied Expeditionary Air Force, under Tedder's supervision. Additional requests from Eisenhower for more bombers than provided for in original plans would have to be approved by the Combined Chiefs.

The way apparently clear, in late March Eisenhower directed that heavy bombers would be used against the railway system in nothern France, Belgium and western Germany. Eisenhower and Tedder also decided to use interdiction strikes

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* For a discussion of the controversy over how strategic air power would be used to support OVERLORD, see Herman S. Wolk, "Prelude to D-Day: The Bomber Offensive," Air Force Magazine, June 1974.

prior to D-Day and to permit Spaatz to attack synthetic oil. This compromise would prove to be crucial. Though Prime Minister Winston Churchill had reservations on the railway plan because he was concerned about how many French civilians might be killed and injured by these attacks, President Roosevelt was not prepared to impose restrictions on bombing. Churchill acquiesced. Prior to D-Day, interdiction strikes were flown against bridges, viaducts and rolling stock. Rail traffic was much reduced and key bridges were wrecked. French civilian casualties were lower than anticipated.

In May, the Eighth Air Force pounded synthetic oil plants in Germany while Fifteenth Air Force struck oil refineries at Ploesti and in Austria, Yugoslavia and Hungary. The Luftwaffe, desperately defending these targets, took severe losses and on D-Day it would be in no position effectively to contest the invasion. Moreover, the Luftwaffe was losing its fuel supply. By August, the Germans were critically hampered by lack of fuel.* Much later, Albert Speer, Germany's Minister of Armaments and War Production, observed that the campaign against oil had proved decisive.

VII.

"The Americans came out of the war in Europe," General Hansell has noted, "with their faith in daylight, precision destruction of key industrial targets intact and fully justified."[45] Whatever qualifications might apply to this statement--and Arnold had several--the final phase of the air offensive against Japan had already begun. Like heavy bomber operations in Europe, strategic bombing against Japan succeeded only after a crucial tactical change was made involving Hansell himself--a switch from high altitude precision daylight bombing to an area

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* German oil production was 195,000 tons in May. In June it plunged to 52,000 tons; in July, 35,000, in August, 16,000 and in September, 7,000 tons.

incendiary blitz at night from low altitude. By 1945, Japan was isolated, already on the way to being strangulated by blockade, and preparing for an expected invasion. Unlike Europe, an invasion would prove unnecessary.

In October 1940, Major General Arnold, Chief of Air Corps, had written the Assistant Secretary of War that the long range, four-engine bomber was the only weapon with which the Army air arm could "hope to exert pressure against Japan without long and costly preliminary operations."[46] The B-17, he observed, lacked range for deep operations. Arnold knew the B-29 could be used best against Japan. He was determined to surprise the Japanese: "If B-29's are first employed against targets other than against Japan, the surprise element will be lost, and the Japs will take the necessary actions to neutralize potential useable bases...."* [47]

Thus, with Operation Matterhorn from the Chengtu Valley of western China, the XX Bomber Command had begun to bomb Japan. It was a start, but no more. Arnold was not satisfied and when Brigadier General Kenneth B. Wolfe insisted he couldn't mount heavier raids because of maintenance and logistics difficulties, the Commanding General, AAF directed him immediately to return to the States to take command of the Materiel Command, a two-star post. On August 29, 1944, Major General Curtis E. LeMay--whom Arnold, in England in 1943, described as "rugged commander"--replaced Wolfe. Arnold later noted that "with all due respect to Wolfe he did his best, and he did a grand job, but LeMay's operations make Wolfe's very amateurish."[48]

Bombing from the Chinese interior proved preliminary to the offensive from the Marianas. From China, B-29 Superforts could reach Kyushu, but not Tokyo or other targets on Honshu. Nonetheless, the four-month operation from Chengtu provided valuable experience for B-29 crews. Once Saipan was secured, B-29's could strike the industrial heart of Japan. On October 12, 1944, the first B-29 arrived at Isley Field, Saipan, piloted by Hansell. Considered a brilliant planner,

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* For a concise history of the B-29, see Carl Berger, B-29: The Superfortress, Ballantine Books, Inc., New York, paper, 1970.

Hansell had been based in Washington as Chief of Staff of the Twentieth Air Force and from there had directed XX Bomber Command's operations in the China-Burma-India theater.*

In October and November, Hansell's crews warmed up against Truk and Iwo Jima. Results were unimpressive. Yet, by late 1944, Japan's position was deteriorating and Arnold--armed with fresh intelligence and anxious to apply the coup de grace with B-29's--thought the time had arrived to strike a fatal blow against the Japanese aircraft industry. Between November 1944 and mid-January 1945, XXI Bomber Command hit the aircraft engine, component and assembly plants.

Again, results were less than had been anticipated. Bad weather, poor accuracy and mechanical failures afflicted what had become a lagging campaign. On January 19, 1945, a highly successful precision attack on the Kawasaki Aircraft Industries Company proved too little and late to save Hansell. In fact, in December Arnold had suppressed his warm personal feeling for Hansell and decided to replace him. Not known for patience when commanders were not producing up to his expectations (witness Eaker and Wolfe), Arnold insisted on results--quickly. The B-29 had been one of his pet projects, much more than time had been invested and Arnold felt he had to show what heavy bombers could accomplish when they were not "misused" in other than strategic operations.

Also, President Roosevelt was concerned about the cost of invasion and he was anxious to have something decisive accomplished before an invasion was necessary. In fact, Hansell himself had not been satisfied with XXI Bomber Command's record. Adhering to the doctrine of high altitude precision bombardment which he had long advocated, his men had been bedeviled by inadequate facilities, unsatisfactory

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* For a consideration of Hansell and the entire B-29 campaign, see Wolk, "The B-29, the A-Bomb, and the Japanese Surrender," Air Force Magazine, February 1975.

maintenance, poor bombing accuracy and most important, by high winds and cloud cover over Japan.

But time was a commodity Arnold couldn't spare. To replace Hansell, he summoned Major General LeMay, who had served as a group commander under Hansell in England in 1943 and who had replaced Wolfe as head of XX Bomber Command in the CBI theater. Known as a hard-driving perfectionist with a flair for tactics, LeMay took command on January 20, 1945. He was well aware of Arnold's impatience and of the desire of Arnold and Brigadier General Norstad (Chief of Staff of Twentieth Air Force) for an incendiary offensive.* Though Hansell had experimented with fire raids, they had been few in number and of limited effectiveness. For a month, LeMay mixed a few incendiary attacks with high altitude precision missions. Then, reminded by Norstad in February and March of the necessity for a major test of incendiaries, LeMay knew that he now had to deliver. "The turkey," he recalled, "was around my neck. We were still going in too high, still running into those big jet-stream winds upstairs. Weather was almost always bad."[49]

The change from precision to area incendiary bombing was of course highly significant. It marked a departure from the precision doctrine that the AAF had espoused since the 1920's and 1930's in the classrooms of the Air Corps Tactical School. This change was not made hastily. Reports of the Foreign Economic Administration in February 1943 and the U.S. Committee of Operations Analysts in November 1943 ("Economic Objectives in the Far East") had emphasized vulnerability of Japanese cities to area incendiary bombing. During 1944, several COA and AAF

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* LeMay described the situation this way: "General Arnold, fully committed to the B-29 program all along, had crawled out on a dozen limbs about a thousand times, in order to achieve physical resources and sufficient funds to build those airplanes and get them into combat....So he finds they're not doing too well. General Arnold was absolutely determined to get results out of this weapons system." (General Curtis E. LeMay with MacKinlay Kantor, Mission With LeMay, Doubleday & Co., Inc., Garden City, 1965, p 338).

reports had noted the same thing. And of course LeMay had been pressed by Arnold and Norstad to use incendiaries.[50]

But what tactics would be most effective? Though LeMay had directed a successful incendiary attack from high altitude on Hankow in December 1944, his experience since January with high altitude bombing from the Marianas indicated that high winds over Japan dictated another approach. Weather had played a large part in Hansell's downfall and LeMay was determined to try "to get us to be independent of weather."[51] After much study with his staff and wing commanders,* he decided on night, low altitude missions, conditions under which clouds and winds were less formidable. These attacks would be made in force by B-29's stripped of guns and ammunition, providing each plane about 3200 additional pounds of bombs. LeMay knew he was taking a calculated risk. The fate of the bombing campaign and his career were to be staked on a night fire bomb offensive run from 5000-9000 feet.**

The great fire bomb raid on Tokyo of March 9-10, 1945, in which LeMay sent 334 Superforts with 2000 tons of bombs, resulted in a holocaust. Conditions were almost perfect for the attackers. The Japanese were caught unprepared--a Pearl Harbor in reverse. The weather was good and the defenders, surprised by planes at low altitude, proved ineffective. The area under attack measured approximately three by four miles and winds spread the fires, creating an inferno. Not even the rivers provided succor and thousands were trapped. Fire fighters could not contain

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*Brigadier Generals Thomas S. Power, Emmett O'Donnell and John H. Davies.

**LeMay remembered that Norstad had explained: "You go ahead and get results with the B-29. If you don't get results, you'll be fired. If you don't get results also, there'll never be any Strategic Air Forces of the Pacific--after the battle is finally won in Europe, and those ETO forces can be deployed here. If you don't get results it will mean eventually a mass amphibious invasion of Japan, to cost probably half a million more American lives." (Mission With LeMay, p 347)

the conflagration and within 30 minutes it raged out of control.* The official casualty report showed 83,793 dead and 40,918 wounded.**

After Tokyo, LeMay's bombers truck Osaka, Kobe and Nagoya, the results confirming the effectiveness of his tactics. These general area attacks brought to mind Air Marshal Harris'.policy, a concept that American airmen for the most part had disdained in Europe, though Dresden and Berlin were exceptions.*** During March 9-19, with an average of 380 planes assigned, XXI Bomber Command flew 1595 sorties and delivered 9365 tons of bombs.[52] This incendiary blitz proved beyond doubt the destructive capability of the B-29. Although XXI Bomber Command supported the Okinawa campaign during the spring, between March and June LeMay dealt crushing blows to the six most important industrial centers of Japan.

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*In Tokyo, there were over 8000 firemen and more than 1000 pieces of equipment, but they were scattered and the downtown area with its density and few fire lanes was especially vulnerable. For a description of what it was like on the ground in Tokyo that night see John Toland, The Rising Sun: The Decline and Fall of the Japanese Empire, 1936-1945 , Vol II, Random House, New York, 1970, p 834.

**Subsequently, the Japan War History Office put the dead at 72,489.

***For years after World War II, it was believed that over 200,000 people had been killed by the British and American bombing attacks on Dresden on February 13-14, 1945. The Nazis had circulated a falsified police report. Subsequently, the Soviets did not allow U.S. or British teams into Dresden to investigate and the Russians publicly supported the 200,000 figure as being correct. However, after occupying Dresden on May 8, 1945, the Soviet authorities had estimated the number killed to be approximately 35,000. In The Destruction of Dresden (William Kimber Co., London, 1963), David Irving estimated 135,000 killed, a figure generally accepted by the public. In 1966, Walter Weidauer, former deputy mayor of Dresden after the war, wrote in Inferno Dresden (Dietz, Berlin, 1966), that the correct fatality figure was 35,000 and also in 1966 Dresden officials gave Irving a copy of the Police President's report, indicating a similar figure. The 35,000 figure is now accepted as correct. As to why the city was bombed, revisionists claim that Dresden was bombed because of Churchill's insistence to bomb cities in eastern Germany (Dresden was a rail center) and because of the Soviet desire, allegedly communicated at Yalta, to aid their massive offensive by slowing the German evacuation from the East and preventing German reinforcements from arriving from the West. Dresden had never been considered part of Operation THUNDERCLAP (for which Berlin was the target) or its successor, CLARION, which called for massive bombing of many towns and cities in Germany. (See Melden E. Smith, Jr., The Bombing of Dresden Reconsidered: A Study in Wartime Decision Making, Ph.D. Dissertation, Boston University, 1971).

Meanwhile, on May 8, 1945, the European war ended. Arnold was now anxious to redeploy from Europe to the Pacific. Prior to the German surrender, the Joint Chiefs of Staff had scheduled an invasion of Kyushu (OLYMPIC) for November 1, 1945 to intensify the blockade and bombardment of Japan prior to a decisive invasion of Honshu. In early June, Arnold flew to the Pacific to complete command arrangements and to find out from LeMay how much longer Japan could hold out.

Arnold asked for LeMay's best judgment as to when the war might end. LeMay told him by October 1, 1945.[53] If this estimate were to prove correct, OLYMPIC would not be necessary. Also while in the Pacific, Arnold received a preliminary report of the U.S. Strategic Bombing Survey (USSBS) which emphasized the disastrous effect strategic bombing had on Germany. This reinforced Arnold's opinion that an invasion would not be necessary. On the same day Arnold was given the USSBS report, he received a cable from General Marshall informing him the JCS would meet with President Truman on June 18 to discuss whether an invasion would be necessary. Arnold then dispatched a message to Marshall supporting OLYMPIC in order "to get additional bases for forty groups of heavy bombers." He also agreed with going ahead with planning for the Honshu assault (CORONET), but recommended keeping it on a live, but postponed basis.

On June 18, Truman approved OLYMPIC and directed that preparations be completed. Meanwhile, bombing and blockade would be intensified. Planning for invasion of Honshu would continue, but no final decision would be made until later. Truman wanted to prevent "an Okinawa from one end of Japan to the other."[54] In June and July 1945, as Truman prepared for the Potsdam conference, the AAF position was to go along with Marshall's advocacy of invasion on the basis that OLYMPIC would secure vital bases. However, Arnold, LeMay and other airmen were convinced an invasion would not be required.[55] Though they went along with Marshall--who had told Arnold he would support an independent Air Force after the war and to whom the AAF owed its quasi-autonomous status--they relentlessly pressed the bombing.

And finally, General Arnold thought it was not necessary to drop the atomic bomb. He had accompanied Truman to Potsdam. On July 16, 1945, the atomic bomb was successfully tested at Alamogordo, N.M., and the news flashed to Potsdam. Truman convened his advisers--Byrnes, Stimson, Leahy, Marshall, Eisenhower, King and Arnold. General Arnold said that in his view it was not necessary to drop the atomic bomb. Under conventional bombing, Japan would capitulate by October.[56] Thus, the decisiveness of the B-29 campaign would be manifest.

However, the President was uncertain how long it would take blockade and conventional bombing to cave in the Japanese. And Marshall felt CORONET, scheduled for March 1946, would cost at least a quarter million American casualties with as many Japanese. Should Japan reject an ultimatum, Truman decided to drop the bomb. On July 26, the Potsdam Declaration was issued, calling for Japan's surrender. No mention was made of the future status of the Emperor. Japan failed to reply to this declaration, which the Allies interpreted as rejection.

Coming back from Potsdam, Truman ordered that the bomb be used. On August 6, it was dropped on Hiroshima. On the eighth, the Soviet Union presented a declaration of war to the Japanese ambassador in Moscow, effective August 9. On the ninth, a second A-bomb was dropped, on Nagasaki. The next day, Japan asked for peace.

The atomic bombs, Arnold wrote, "did not cause the defeat of Japan, however large a part they may have played in assisting the Japanese decision to surrender." Japan surrendered, in his view, "because air attacks, both actual and potential, had made possible the destruction of their capability and will for further resistance ....those....attacks....had as a primary objective the defeat of Japan without invasion."[57]

Had the bomb not been used, would Japan have surrendered prior to the scheduled November 1 invasion of Kyushu? This cannot be determined for certain. Truman and Marshall thought it would take months. Arnold, Leahy and King were convinced Japan

could be knocked out before invasion. LeMay had told Arnold the war would end by October 1. After the war, some Japanese leaders said that even without the atomic bombs, they could not have held out much longer. The United States Strategic Bombing Survey concluded that, without the A-bomb and invasion, Japan would have accepted unconditional surrender probably by November 1 and definitely by the end of the year.* Despite having substantial forces ready to defend the home islands, Japan had already been defeated, but was not willing to surrender. If continued, could precision bombing have had the same result as LeMay's use of area incendiary bombing? In retrospect, Hansell thought so, though he admitted it would have taken longer.[58] Nonetheless, Arnold felt he needed results. He knew an invasion was being planned. He saw it as a race against time. His opinion that it was not necessary to use the atomic bomb was based on his conviction that the B-29 conventional campaign could make the decisive contribution to the defeat of Japan. For years, air leaders had argued that air power could accomplish the defeat of nations. Massive invasions were not required.

Reflecting on the crucial decisions that affected so many lives, a comment about General Arnold seems appropriate. He was the architect of the Air Force. When the determination of others flagged, his conviction that the strategic bombing offensive eventually would be decisive, spelled the difference. Not a strategical thinker, he emphasized the principle of concentrating massive power at the critical point--thus his displeasure when he concluded that commanders (like Eaker and Wolfe), despite perhaps insurmountable problems, should be sending more bombers out. Fortunately, Arnold understood politics in the broad sense and in this respect the Allied cause had an ideal man for a demanding task. At close range, he

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* For the story of the origins and work of the United States Strategic Bombing Survey (USSBS), see David MacIsaac, Strategic Bombing in World War II: The Story of the United States Strategic Bombing Survey, Garland Publishing, Inc., New York and London, 1976.

saw Billy Mitchell destroyed, but unlike his predecessor, when it came to the politics of aviation, he disclaimed the meat-axe when a surgical instrument would do.

Deceptively unassuming, Arnold had an extraordinary ability to grasp an idea and drive it through seemingly interminable channels to fruition. To critics, he was a "promoter," but during the global conflict his knowledge of American industry and rapport with its captains, proved invaluable. Ever the consummate manager and unusually competent in the scientific and technical aspects of aviation, he rarely allowed personalities or sentimentality to muddle his decisions. More than any other airman, he shaped the air arm and set the example with his determination.

VIII.

The United States emerged from World War II as the world's strongest nation. Unlike the European combatants, whose cities and economies lay in ruins, America was not only intact, but possessed the world's mightiest industrial machine. It also had the atomic bomb, though the overpowering image that the bomb conferred on the strategic air forces was more apparent than real. After the war, the U.S. had only a few atomic bombs. The 509th Group--which had delivered the bombs on Hiroshima

and Nagasaki--was the AAF's only atomic unit. Moreover, the B-29's lacked intercontinental range.

After the war, the Army Air Forces concentrated on becoming a separate service. As airmen conceived it, achievement of this objective depended to a great extent upon public and Congressional realization and acceptance of the major contribution to victory made by the AAF. These men who led the Army Air Forces after World War II were products of the unfulfilled years (as they viewed them) between the wars. Even after the Second World War, they remained sensitive about what they perceived to be the wounds inflicted upon them by the War Department during the 1920's and 1930's. And they were combative about what they thought they had accomplished in the war just concluded.

The war had provided them the opportunity to demonstrate air power's effectiveness. Strategic bombing had made a signigicant contribution to victory over the Axis--as did tactical air--and air leaders were convinced that their weapon had proved to be an indispensable instrument of modern warfare. In fact, Arnold and Spaatz had formulated plans for an even more powerful air offensive against Japan, using forces transferred to the Pacific from Europe, but the Japanese had capitulated before these attacks could be made. "We were never able," noted Arnold, "to launch the full power of our bombing attack....The power of those attacks would certainly have convinced any doubting Thomases as to the capabilities of a modern Air Force. I am afraid that from now on there will be certain people who will forget the part we have played."[59]

AAF leaders were convinced that the war had proved the validity of strategic bombardment doctrine as it was refined in combat. Strategic bombing, Spaatz wrote, had "to be worked out by experiment, in the grim practice of war." The war's lessons were clear: "Strategic bombing is the first war instrument of history capable of stopping the heart mechanism of a great industrialized enemy. It paralyzes his

military power at the core."[60] Airmen thought Americans would accept area bombing if they thought it would shorten the war. For decades this idea had been advocated by Marshal Trenchard who argued that air power would save "countless casualties both in the field and at sea." Without air power, he observed, "the present war would have wiped out not only a generation, but the whole life of the nations and then would probably have ended in a stalemate. There would have been....no destruction of Germany and crippling of the German war economy."[61]

Thus, air superiority was the key to lowering the cost of victory. The concept of strategic warfare, Spaatz noted, was "to shorten the strife by striking directly at the heart of the enemy's industrial, economic, communications and control organizations...." The bombing against German industry was "a unique means of sparing human life."[62] Spaatz' views on strategic bombing followed the historical development of the Trenchard-Mitchell-Arnold school. Protracted ground wars must be avoided. "Attritional war," Spaatz wrote after succeeding Arnold in February 1946 as Commanding General, AAF, "might last years....would cost wealth that centuries alone could repay and....would take untold millions of lives."[63] According to this view, by promising a short cut to victory, the strategic air forces now comprised the pre-eminent military force that wielded the power of decision in modern war.

Also, strategic bomber forces could be used as "a show of force." For example, in the Berlin crisis of June 1948, President Truman approved dispatch of two B-29 groups to England to join the group already on rotation in Germany. This was largely a symbolic move, since--contrary to most accounts--these B-29's were not atomic-modified.* They were not able to carry atomic bombs and as General LeMay (sent to

*Richard F. Haynes has written: "The nuclear-weapons planes went to European stations without an established policy as to the use of the bombs which were--theoretically at least--nestled in their bellies. The B-29's were atomic guns pointed at the Soviet heartland. Russian intelligence was reasonably sure Truman would not pull the nuclear trigger over Berlin. However, neither they, nor Truman's military advisers, really knew." (Richard F. Haynes, The Awesome Power: Harry S. Truman as Commander in Chief, Louisiana State University Press, Baton Rouge, 1973, p 143)

organize the airlift) recalled, the B-29's "were not able to do much of anything."[64] Consequently, though at the time the Russians may have thought differently (U.S. officials intended so), the U.S. response to the Berlin crisis of 1948 was much less than originally supposed.

The war had provided bomber airmen their first and last opportunity to show the effectiveness of huge bomber forces. Seen another way, reflecting on the years when bomber advocates struggled to make their point, the war can be viewed as proof of General Arnold's opinion that "the No. 1 job of an air force is bombardment."[65] But such is the nature of human affairs, that no sooner had the war ended, than even this conclusion came under attack by critics. Thus, in retrospect, Arnold seemed to have called the turn: "I am afraid that from now on there will be certain people who will forget the part we have played."

Nonetheless, long-range bombers of the Strategic Air Command (established in March 1946) dominated the U.S. strategic force structure during the 1950's. When land-based ICBM's and the Polaris submarine became operational, the bomber force then constituted just one part of the so-called triad of strategic forces. The Kennedy administration emphasized Polaris and Minuteman. When the last B-52H and B-58 came out of production in the fall of 1962, it marked the first time since 1945 that a strategic bomber was not in production. The B-70 had been downgraded from a weapons system to an experimental aircraft in December 1959 and would remain in this status until cancelled.

Evolution of McNamara's doctrine of "assured destruction" was an important milestone in thinking about the role of the bomber. Assured destruction was tailored to strengths of the ballistic missile, emphasizing ability to survive a first strike and then deliver a retaliatory attack. The manned bomber, on the other hand, was considered less "cost effective," more vulnerable and less reliable.

However, bombers had played an important role in the Korean war (B-29's) and subsequently in Vietnam (B-52's). Designed primarily for strategic bombing, the B-52 in Vietnam was used effectively in a tactical role. Also, in the Cuban missile crisis of October-November 1962, SAC's bombers were placed on increased alert to help persuade Premier Khrushchev to take the missiles out of Cuba. Thus, since World War II the bomber has remained a useful weapon in the U.S. arsenal. It is the only system of the triad which can deliver conventional weapons, this capability having been built into the B-52. And once launched, the bomber is recallable.

Over thirty years have elapsed since the end of World War II. Now, at the beginning of the last quarter of the twentieth century, the future of the strategic bomber is uncertain. What is certain is that there will not be another war like World War II. The great bomber armadas will not go forth by the hundreds and thousands to strike strategic objectives.

It is impossible to know what role the long-range bomber may play in the force structure of the future. And it is difficult to determine what factors will weigh most importantly in the decision on the bomber's future. Even where technology is concerned, the shape of the future is determined primarily by resolving the complexities of human affairs. To those brave enough to risk prediction, history is a stern and unforgiving taskmaster.

The difficulties and surprises that distinguish the history of strategic air operations are sufficient reminder of that.

FOOTNOTES

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